

## Equilibrium II

1) Solve for  $T_1$  and  $T_2$ 

$$T_1 \cos(30^\circ) + T_2 \cos(50^\circ) = 688$$

$$T_1 = \frac{2 \cdot T_2 \cos(50^\circ)}{\sqrt{3}}$$

$$T_1 \sin(30^\circ) + T_2 \sin(50^\circ) = 688$$

$$\Rightarrow \frac{T_1}{2} + T_2 \sin(50^\circ) = 688$$

$$\Rightarrow \frac{T_2 \cos(50^\circ)}{\sqrt{3}} + T_2 \sin(50^\circ) = 688$$

$$\Rightarrow T_2 \left( \frac{\cos(50^\circ)}{\sqrt{3}} + \sin(50^\circ) \right) = 688 \Rightarrow T_2 = \frac{688}{\frac{\cos(50^\circ)}{\sqrt{3}} + \sin(50^\circ)}$$

$$\frac{T_1}{2} + 605 \sin(50^\circ) = 688$$

$$\Rightarrow \frac{T_1}{2} = 688 - 605 \sin(50^\circ)$$

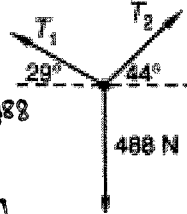
$$\therefore T_1 = 2(688 - 605 \sin(50^\circ)) = 449.1 \text{ N}$$

2) Solve for  $T_1$  and  $T_2$ 

$$T_1 \cos(29^\circ) = T_2 \cos(44^\circ) \quad T_1 \sin(29^\circ) + T_2 \sin(44^\circ) = 488$$

$$T_2 = \frac{T_1 \cos(44^\circ)}{\cos(29^\circ)} \Rightarrow \frac{T_1 \cos(44^\circ) \sin(29^\circ)}{\cos(29^\circ)} + T_1 \sin(44^\circ) = 488$$

$$\Rightarrow T_2 = \frac{488}{\left[ \frac{\cos(44^\circ) \sin(29^\circ)}{\cos(29^\circ)} + \sin(44^\circ) \right]}$$



$$T_1 = \frac{T_2 \cos(44^\circ)}{\cos(29^\circ)}$$

$$= \frac{446.3}{\cos(29^\circ)}$$

$$\therefore T_1 = 507.1 \text{ N}$$

3) Solve for  $T_1$  and  $T_2$ 

$$T_1 = \frac{W \cos(T_2)}{\sin(T_1 + T_2)}$$

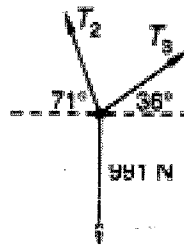
$$= \frac{991 \cos(36^\circ)}{\sin(71^\circ + 36^\circ)}$$

$$\therefore T_1 = 838.4 \text{ N}$$

$$T_2 = \frac{W \cos(T_1)}{\sin(T_1 + T_2)}$$

$$= \frac{991 \cos(71^\circ)}{\sin(107^\circ)}$$

$$\therefore T_2 = 337.4 \text{ N}$$

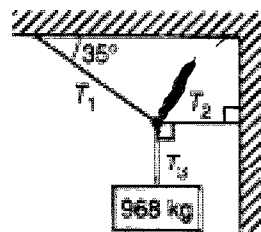
4) Solve for  $T_1$  and  $T_2$ 

$$T_1 = \frac{9496 \cos(35^\circ)}{\sin(90^\circ + 35^\circ)}$$

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$$\therefore T_1 = 7755.8 \text{ N}$$

$$\therefore T_2 = 7755.8 \text{ N}$$



$$T_3 = 9496 \text{ N } (9.81 \text{ m/s}^2)$$

5) Solve for  $T_1$  and  $T$ 

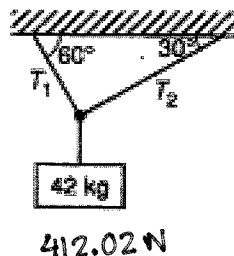
$$T_1 = \frac{412 \cos(30^\circ)}{\sin(90^\circ)}$$

$$= 412 \cos(30^\circ)$$

$$= 356.8 \text{ N}$$

$$T_2 = 412 \cos(60^\circ)$$

$$= 206 \text{ N}$$



$$412.02 \text{ N}$$